

Claims 5 and 6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida.

Claims 7, 9 and 11-13 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida and further in view of Woo (USP 5,816,891).

Claims 2, 4, 8 and 10 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida or Yoshida/Woo and further in view of admitted prior art.

As amended, all the pending claims of the subject application comply with all requirements of 35 U.S.C. Accordingly, Applicant requests examination and allowance of all pending claims.

Formal Matters

With respect to paragraph number 7 on page 4 of the Office Action regarding the objections to the drawings, Applicants note that corrections to the Specification have been made changing reference numbers 40 and 42 listed on page 7 of the Specification to "load cup 60" and "rotatable crossbar 62." Accordingly, reference numbers 40 and 42 no longer appear in the Specification and corrections to the drawings are believed to be unnecessary. Withdrawal of this objection is respectfully requested.

Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned "Version With Markings to Show Changes Made."

The Rejection of the Independent Claim 1:

A. Anticipation

Independent claim 1 stands rejected under 35 U.S.C. 102(b) as being anticipated by Yoshida et al. (JP 11-138418). Claim 1 has been amended and this rejection is respectfully traversed.

Claim 1 has been amended to recite that the "polishing pad is not roughened by a pad conditioner between polishing the first and second portions of the material." Support for this amendment exists throughout the specification including page 6, lines 3-17. As amended claim 1 is not anticipated by Yoshida et al. Accordingly, withdrawal of the Section 102 rejection is respectfully requested.

B. Obviousness

Claim 1 is also not obvious in view of Yoshida et al. As is known by the Examiner, obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion or motivation to do so in the prior art. Yoshida et al. fails to suggest or provide any motivation to modify the method disclosed therein to a method including "polishing [a] substrate to remove a first portion of [material] ... rinsing the polishing pad ... and polishing the substrate to remove a second portion of [material] ... wherein the polishing pad is not roughened by a pad conditioner between the polishing the first and second portions of the material." The only disclosure within Yoshida of polishing a single substrate with the same polishing pad in two separate steps is a process that breaks the polishing process into multiple steps specifically to allow for the polishing pad to be conditioned (Yoshida refers to conditioning a pad as "dressing" the pad) before the end of the polishing process in order to "unclog" the polishing pad. See Yoshida, col. 13, lines 12-27. Accordingly, Applicants respectfully assert that claim 1 is not obvious in view of Yoshida.

The Rejections of Independent Claim 7:

Independent claim 7 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida and further in view of Woo (USP 5,816,891). This rejection is respectfully traversed.

Claim 7 has been amended in a manner similar to claim 1. Specifically, claim 7 has been amended to recite that the "polishing pad is not roughened by a pad conditioner between polishing the first and second portions of the material." Support for this amendment exists throughout the specification including page 6, lines 3-17.

Yoshida does not teach or suggest this aspect of the invention of claim 7 for reasons similar to those discussed above with respect to claim 1. Furthermore, the secondary reference Woo, does not make up for this deficiency of the primary reference. Woo teaches an inline CMP process that sequentially polishes a substrate using multiple polishing pads. There is no disclosure or suggestion within Woo of "polishing [a] substrate to remove a first portion of [material] ... rinsing the polishing pad ... and polishing the substrate to remove a second portion of [material with the same polishing pad]" as recited in claim 7 with or without a conditioning step between the two polishing steps. Accordingly, Applicants respectfully assert that claim 7 is

not obvious in view of the Yoshida and Woo references and withdrawal of the Section 103 rejection of claim 7 is respectfully requested.

Dependent Claims:

Applicants respectfully assert that claims 2-6, which depend from claim 1, are allowable for at least the same reasons as their parent claim.

Applicants also respectfully assert that claims 8-13, which depend from claim 7, are allowable for at least the same reasons as their parent claim.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE SPECIFICATION:

Paragraph beginning at line 6 of page 7 has been amended as follows:

Polishing system 50 includes a load cup 60 and a rotatable cross bar 62 to which a plurality of wafer mounting heads 29a d are coupled. Thus, a wafer W may be loaded onto the load cup [40] 60 and loaded or mounted therefrom to the first wafer mounting head 29a while wafer mounting heads 29b d press wafers against the polishing pads 17a 17c of the various polishing stations 52₁-52₃.

Paragraph beginning at line 11 of page 7 has been amended as follows:

In operation, a first wafer W₁ is loaded (e.g., via a wafer handler that is not shown) onto load cup 60 and mounted therefrom to first wafer mounting head 29a. Rotatable cross bar 62 is indexed carrying the first wafer W₁ to the first polishing station 52₁ where wafer W₁ is to be polished, while a second wafer W₂ is loaded onto load cup 60 and mounted therefrom to the second wafer mounting head 29b. The rotatable cross bar [42] 62 is indexed again; the wafer W₁ is polished by the second polishing station 52₂ (e.g., with a different polishing fluid than that used by the first polishing station 52₁); the second wafer W₂ is polished by the first polishing station 52₁ and a third wafer W₃ is loaded to the load cup 60 and mounted to the third wafer mounting head 29c.

Paragraph beginning at line 21 of page 7 has been amended as follows:

Thereafter, rotatable cross bar [40] 62 indexes and the first wafer W₁ is carried to polishing station 52₃. Meanwhile, the second wafer W₂ is polished by second polishing station 52₂; the third wafer W₃ is polished by first polishing station 52₁ and a fourth wafer W₄ is loaded onto load cup 60 and mounted to a fourth wafer mounting head 29d.

Paragraph beginning at line 26 of page 7 has been amended as follows:

The rotatable cross bar [42] 62 then indexes carrying the first wafer W₁ to load cup 60 where the first wafer mounting head 29a places the first wafer W₁ on the load cup 60 and a wafer handler (not shown) extracts the first wafer W₁ from the system 38.

IN THE CLAIMS:

Please amend claims 1 and 7 as follows. Note that claims 2-6 and 8-13 remain unchanged, but are reproduced below for the Examiner's convenience and reference.

1 1. (Amended) A multistep method of polishing a semiconductor substrate
2 with a polishing fluid to remove a selected amount of material from said substrate, said method
3 comprising:
4 polishing said substrate to remove a first portion of said selected amount of
5 material by holding said substrate against a polishing pad with a polishing force while applying a
6 polishing solution to said polishing pad;
7 rinsing said polishing pad with a rinsing fluid; and
8 polishing said substrate to remove a second portion of said selected amount of
9 material by holding said substrate against said polishing pad with a polishing force while
10 applying said polishing fluid to said polishing pad, wherein the polishing pad is not roughened
11 by a pad conditioner between polishing the first and second portions of the material.

1 2. (Unchanged) The method of claim 1 wherein said polishing fluid is an
2 unstable polishing fluid.

1 3. (Unchanged) The method of claim 1 wherein said first portion and said
2 second portion equal said selected amount.

1 4. (Unchanged) The method of claim 2 wherein said unstable polishing fluid
2 is mixed in a point of use mixing system prior to applying said polishing solution to said
3 polishing pad.

1 5. (Unchanged) The method of claim 1 wherein said rinsing fluid comprises
2 deionized water.

1 6. (Unchanged) The method of claim 1 wherein said rinsing is done while
2 said substrate is held against said polishing pad with a 0 psi force.

1 7. (Amended) A multistep method of polishing a semiconductor substrate in
2 an inline polishing that includes at least first and second polishing stations, wherein said first

3 polishing station includes a first polishing pad and said second polishing station includes a
4 second polishing pad, said method comprising:
5 transferring said substrate to said first polishing station;
6 polishing said substrate to remove a first portion of material by holding said
7 substrate against said first polishing pad with a polishing force while applying a first polishing
8 solution to said first polishing pad;
9 rinsing said first polishing pad with a rinsing fluid;
10 polishing said substrate to remove a second portion of material by holding said
11 substrate against said first polishing pad with a polishing force while applying said first polishing
12 fluid to said first polishing pad, wherein the polishing pad is not roughened by a pad conditioner
13 between polishing the first and second portions of the material;
14 transferring said substrate to said second polishing station; and
15 polishing said substrate to remove a third portion of material by holding said
16 substrate against said second polishing pad with a polishing force while applying a second
17 polishing solution to said second polishing pad.

1 8. (Unchanged) The method of claim 7 wherein said polishing fluid is an
2 unstable polishing fluid.

1 9. (Unchanged) The method of claim 7 wherein said first portion and said
2 second portion equal said selected amount.

1 10. (Unchanged) The method of claim 8 wherein said unstable polishing fluid
2 is mixed in a point of use mixing system prior to applying said polishing solution to said
3 polishing pad.

1 11. (Unchanged) The method of claim 7 wherein said rinsing fluid comprises
2 deionized water.

1 12. (Unchanged) The method of claim 7 wherein said rinsing is done while
2 said substrate is held against said polishing pad with a 0 psi force.

- 1 13. (Unchanged) The method of claim 7 wherein said substrate is transferred
- 2 to and polished at said second polishing station before being transferred to and polished at said
- 3 first polishing station.